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1   UNITED STATES PATENT AND TRADEMARK OFFICE
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4   BEFORE THE BOARD OF PATENT APPEALS
5   AND INTERFERENCES
6   _____
7
8   *Ex parte* MUKESH DALAL
9   _____
10
11   Appeal 2008-2544
12   Application 09/528,457
13   Technology Center 3600
14   _____
15
16   Decided: September 19, 2008
17   _____
18
19 Before WILLIAM F. PATE, III, ANTON W. FETTING, and
20 STEVEN D.A. McCARTHY, *Administrative Patent Judges.*
21
22 FETTING, *Administrative Patent Judge.*
23
24
25   DECISION ON APPEAL
26
27   STATEMENT OF THE CASE
28   Mukesh Dalal (Appellant) seeks review under 35 U.S.C. § 134 of a
29 final rejection of claims 1-3, 5-7, 10-15, 17-19, 21-23, 26-31, 33-35, 37-39,
30 and 42-50, the only claims pending in the application on appeal.
31   We have jurisdiction over the appeal pursuant to 35 U.S.C. § 6(b)
32 (2002).

1   We AFFIRM.

2   The Appellant invented a way of optimizing results under multi-party

3   constraints (Specification 1:6-7).

4   An understanding of the invention can be derived from a reading of

5   exemplary claim 1, which is reproduced below [bracketed matter and some

6   paragraphing added].

7   1. A computer-implemented system for multi-party constrained
8   optimization, the system comprising one or more processing
9   units and one or more memory units collectively operable to:

10   [1] access

11   a first optimization problem and

12   a first threshold value corresponding to a first party to a
13   negotiation,

14   the first optimization problem comprising

15   at least one first objective to which the first
16   threshold value relates and

17   one or more first constraints to which the at least
18   one first objective relates;

19   [2] access

20   a second optimization problem and

21   a second threshold value corresponding to a second party
22   to the negotiation,

23   the second optimization problem comprising

24   at least one second objective to which the second
25   threshold value relates and

26   one or more second constraints to which the at
27   least one second objective relates;

28   [3] generate a global solution to a global optimization problem,

29   the global solution comprising

1   a first objective value for the at least one first
2   objective and

3   a second objective value for the at least one second
4   objective

5   such that the first and second objective values are
6   consistent with value [sic[1]]

7   the one or more first constraints,

8   the first threshold value,

9   the one or more second constraints, and

10   the second threshold value,

11   the global solution representing

12   a first excess between

13   the first objective value and

14   the first threshold value and

15   a second excess between

16   the second objective value and

17   the second threshold value,

18   the global solution being generated considering a
19   fairness criterion specifying one of the following:

20   [4a] that the first excess must equal the second
21   excess,

22   the fairness criterion comprising an equal
23   distribution criterion;

---

[1] It is not clear exactly what phrasing is intended. The Appellant repeated this phrasing in the Summary of Claimed Subject Matter (Appeal Br. 7), so that section of the Brief is unhelpful. The portions of the Specification cited to support this limitation, Specification 3:11-15 and 9:18-26 (Appeal Br. 7), do not describe the consistency recited in this particular phrase in the claim. We take this phrase to mean "consistent with values relating to" based on the apparent support for this phrase at Specification 10:1-4.

[4b] that a ratio of the first excess to the second excess must equal a ratio of the first threshold value to the second threshold value,

the fairness criterion comprising a geometric distribution criterion;

[4c] that a ratio of the first excess to the second excess must equal a ratio of a first weight for the first party to a second weight for the second party,

the fairness criterion comprising a weighted distribution criterion; and

[4d] that a ratio of the first objective value to the first threshold value must equal a first weight for the first party and a ratio of the second objective value to the second threshold value must equal a second weight for the second party,

the fairness criterion comprising a weighted geometric distribution criterion.

This appeal arises from the Examiner's Final Rejection, mailed January 27, 2004. The Appellant filed an Appeal Brief in support of the appeal on March 6, 2006. An Examiner's Answer to the Appeal Brief was mailed on May 19, 2006. A Reply Brief was filed on July 17, 2006. A corrected Appeal Brief was filed on May 8, 2007. References to the Appeal Brief in this Decision refer to this corrected May 8, 2007 Appeal Brief.

PRIOR ART

The Examiner relies upon the following prior art:

Lupien	US 5,950,177	Sep. 7, 1999
Thiessen	US 5,495,412	Feb. 27, 1996
Midorikawa[2]	US 5,953 708	Sep. 14, 1999

REJECTION[3]

Claims 1-3, 5-7, 10-15, 17-19, 21-23, 26-31, 33-35, 37-39, and 42-50 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Lupien and Thiessen.

ISSUES

The issue pertinent to this appeal is whether the Appellant has sustained its burden of showing that the Examiner erred in rejecting claims 1-3, 5-7, 10-15, 17-19, 21-23, 26-31, 33-35, 37-39, and 42-50 under 35 U.S.C. § 103(a) as unpatentable over Lupien and Thiessen.

The pertinent issue turns on whether the art applied describes the constraints of limitations [1] to [3] and any of the criteria in limitations [4a]-[4d].

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[2] The Examiner relies on Midorikawa as evidence of what one of ordinary skill knew, and does not apply this reference directly in the rejection.
[3] The Examiner nominally presents this as two separate rejections over the same art (Answer 3 and 7). We treat them together because the same art is applied in both nominal rejections, and the analysis is similar in each.

1   FACTS PERTINENT TO THE ISSUES

2   The following enumerated Findings of Fact (FF) are believed to be

3 supported by a preponderance of the evidence.

4   *Lupien*

5   01.   Lupien is directed to an automated crossing network (also

6   known as a matching system) for trading instruments, and in

7   particular, a continuous crossing network that matches buy and

8   sell orders based upon a satisfaction and size profile (Lupien 1:9-

9   13).

10   02.   Lupien allows traders to input as orders a satisfaction density

11   profile and maximum size limit which at once characterizes the

12   trader's degree of satisfaction to trade at any and all prices and

13   sizes, up to the aggregate (or size) limit, and that matches orders

14   (as represented by each trader's satisfaction density profile) so that

15   each trader is assured that the overall outcome of the process (in

16   terms of average price and size of fill) has maximized the mutual

17   satisfaction of all traders (Lupien 3:49-58).

18   03.   Lupien Figs. 9A-C portray contour plots of four mutual

19   satisfaction solutions, each contour representing those points

20   having the same satisfaction cross product and each chart is for a

21   separate combination of parties (Lupien 12:16-50). The mutual

22   satisfaction cross product represents the potential for that buy/sell

23   pair mutually to satisfy each side. Each point represents the price

24   and quantity bought and sold to achieve the satisfaction value

25   shown on a contour (Lupien 9:24-30).

1   *Thiessen*

2   04.   Thiessen is directed to a way for assisting multiple parties

3   involved in complex negotiations in reaching an agreement that

4   optimizes the individual and overall benefit to the parties

5   (Thiessen 1:9-13). Thiessen does this using an Interactive

6   Computer-Assisted Negotiation Process Support System

7   (otherwise known as ICANS) which assists parties in real time

8   toward achieving an optimal, mutually satisfactory agreement in

9   dynamic, multi-issue, multi-party negotiations (Thiessen 3:11-17).

10   05.   Thiessen optimizes the satisfaction of all parties by first having

11   parties identify at least one alternative solution to the problem that

12   their party would find acceptable. Thiessen searches for

13   equivalent alternatives to party proposals by using linear

14   programming to solve an optimization problem for which the

15   objective is to insure no loss in satisfaction for any party while

16   minimizing the maximum gain achieved by any party. If all

17   parties accept the alternative generated by ICANS as a tentative

18   agreement, that alternative is known as a common base alternative

19   (common base for short). The purpose of establishing the

20   common base is to facilitate the negotiations by converting

21   inconsistent proposals offered by each party into what is for

22   everyone an equivalent one from which joint negotiations can

23   proceed (Thiessen 3:29-43).

24   06.   Once a common base has been established, Thiessen searches

25   for an improved alternative solution on the satisfaction tradeoff

26   function defining the efficiency frontier that will bring greater or

1   equal satisfaction to all parties as compared to the common base.
2   To find an alternative on the efficiency frontier that improves
3   upon the common base alternative, ICANS seeks to maximize the
4   minimum gain in total relative satisfaction that can be achieved by
5   each of the parties, again using standard linear programming
6   techniques. The result is an alternative agreement that improves
7   the satisfaction of one or more of the parties without decreasing
8   the satisfaction of any of the parties (Thiessen 3:52-64).

9   07. Thiessen's Fig. 5 is a graph illustrating the satisfaction of Party
10   Blue as a function of the satisfaction of Party Green. The point
11   labeled B represents the levels of satisfaction provided by Party
12   Blue's proposal, while the point labeled G represents the
13   satisfaction levels provided by Party Green's proposal. The curve
14   labeled EF in FIG. 5 is a boundary defining what is commonly
15   known in the art as the "efficiency frontier," where efficiency is
16   defined according to Pareto. This boundary defines the group of
17   satisfaction points that provide the most efficient possible
18   solutions to the conflict. In determining the common base
19   alternative represented by point E, Thiessen attempts to maintain
20   the satisfaction level of both parties the same as in their chosen
21   proposals. The goal therefore is to "minimize the maximum gain"
22   in satisfaction that either of the two parties experiences in going
23   from their proposal to the common base alternative. In other
24   words, it is most desirable that the maximum gain be zero for both
25   parties (Thiessen 15:4-29).

08.   Thiessen's Fig. 5 also shows a diagonal ray with a slope of 1 that includes the equivalent satisfaction point E representing the common base alternative, and passes through a shaded region labeled MG known as the region of mutual gain. This region is so named because any alternatives that lie therein will provide gains in satisfaction to both parties as compared to the common base alternative. For this two party problem, the ray divides the shaded region of mutual gain into two portions. If an alternative exactly equivalent to all party proposals exists, "minimizing the maximum gain" will find it at the equivalent satisfaction Point E. If such an alternative does not exist, the solution will be the closest feasible alternative within the region of mutual gain (Thiessen 15:30-50).

09.   Thiessen's point W results in a satisfaction to Party Blue and to Party Green of 97, both of which provide substantial improvements in satisfaction to each of the parties than was provided by their original individual proposals (Thiessen 16:53-57; Fig. 5.

10.   Thiessen's Fig. 2A portrays a selection step in which parties choose among options to define satisfaction tradeoffs that are used to compute which solutions are selected.

Facts Related To The Level Of Skill In The Art

11.   Neither the Examiner nor the Appellant has addressed the level of ordinary skill in the pertinent arts of systems analysis and programming, operations research, optimization theory and analysis, programming techniques for optimization systems, linear algebra, and management information systems design. We will

1   therefore consider the cited prior art as representative of the level

2   of ordinary skill in the art. *See Okajima v. Bourdeau*, 261 F.3d

3   1350, 1355 (Fed. Cir. 2001) ("[T]he absence of specific findings

4   on the level of skill in the art does not give rise to reversible error

5   'where the prior art itself reflects an appropriate level and a need

6   for testimony is not shown'") (quoting *Litton Indus. Prods., Inc. v.*

7   *Solid State Sys. Corp.*, 755 F.2d 158, 163 (Fed. Cir. 1985).

8   12.   One of ordinary skill in the operations research arts knew that

9   linear programming was a technique that optimized objective

10   values under given constraints.

11   *Facts Related To Secondary Considerations*

12   13.   There is no evidence on record of secondary considerations of

13   non-obviousness for our consideration.

14   PRINCIPLES OF LAW

15 *Claim Construction*

16   During examination of a patent application, pending claims are

17 given their broadest reasonable construction consistent with the

18 specification. *In re Prater*, 415 F.2d 1393, 1404-05 (CCPA 1969);

19 *In re Am. Acad. of Sci. Tech Ctr.*, 367 F.3d 1359, 1364, (Fed. Cir.

20 2004).

21   Limitations appearing in the specification but not recited in the claim

22 are not read into the claim. *E-Pass Techs., Inc. v. 3Com Corp.*, 343 F.3d

23 1364, 1369 (Fed. Cir. 2003) (claims must be interpreted "in view of the

24 specification" without importing limitations from the specification into the

25 claims unnecessarily).

1   Although a patent applicant is entitled to be his or her own

2   lexicographer of patent claim terms, in *ex parte* prosecution it must be

3   within limits. *In re Corr*, 347 F.2d 578, 580 (CCPA 1965). The applicant

4   must do so by placing such definitions in the Specification with sufficient

5   clarity to provide a person of ordinary skill in the art with clear and precise

6   notice of the meaning that is to be construed. *See also In re Paulsen*, 30

7   F.3d 1475, 1480 (Fed. Cir. 1994) (although an inventor is free to define the

8   specific terms used to describe the invention, this must be done with

9   reasonable clarity, deliberateness, and precision; where an inventor chooses

10   to give terms uncommon meanings, the inventor must set out any

11   uncommon definition in some manner within the patent disclosure so as to

12   give one of ordinary skill in the art notice of the change).

13   *Obviousness*

14   A claimed invention is unpatentable if the differences between it and

15   the prior art are "such that the subject matter as a whole would have been

16   obvious at the time the invention was made to a person having ordinary skill

17   in the art." 35 U.S.C. § 103(a) (2000); *KSR Int'l Co. v. Teleflex Inc*., 127 S.

18   Ct. 1727, 1729-30 (2007); *Graham v. John Deere Co*., 383 U.S. 1, 13-14

19   (1966).

20   In *Graham*, the Court held that the obviousness analysis is bottomed

21   on several basic factual inquiries: "[(1)] the scope and content of the prior art

22   are to be determined; [(2)] differences between the prior art and the claims at

23   issue are to be ascertained; and [(3)] the level of ordinary skill in the

24   pertinent art resolved." 383 U.S. at 17. *See also KSR Int'l v. Teleflex Inc*.,

25   127 S. Ct. at 1734. "The combination of familiar elements according to

1   known methods is likely to be obvious when it does no more than yield

2   predictable results." *KSR*, at 1739.

3   "When a work is available in one field of endeavor, design incentives

4   and other market forces can prompt variations of it, either in the same field

5   or a different one. If a person of ordinary skill can implement a predictable

6   variation, § 103 likely bars its patentability." *Id*. at 1740.

7   "For the same reason, if a technique has been used to improve one

8   device, and a person of ordinary skill in the art would recognize that it would

9   improve similar devices in the same way, using the technique is obvious

10   unless its actual application is beyond his or her skill." *Id.*

11   "Under the correct analysis, any need or problem known in the field

12   of endeavor at the time of invention and addressed by the patent can provide

13   a reason for combining the elements in the manner claimed." *Id.* at 1742.

14   <div align="center">ANALYSIS</div>

15   *Claims 1-3, 5-7, 10-15, 17-19, 21-23, 26-31, 33-35, 37-39, and 42-50*
16   *rejected under 35 U.S.C. § 103(a) as unpatentable over Lupien and*
17   *Thiessen.*
18
19   *Claims 1, 2-3, 5-7, 10, 15, 17-19, 21-23, 26, 31, 33-35, 37-39, 42, and*
20   *47*

21   The Appellant argues claims 1, 2-3, 5-7, 10, 15, 17-19, 21-23, 26, 31,

22   33-35, 37-39, 42, and 47 as a group.

23   Accordingly, we select claim 1 as representative of the group.

24   37 C.F.R. § 41.37(c)(1)(vii) (2007).

25   The Examiner found that Lupien described each of limitations [1], [2],

26   and [3], but did not describe any of the alternative limitations [4a], [4b],

27   [4c], or [4d]. To overcome this deficiency, the Examiner found that

28   Thiessen described alternative limitation [4a] (Answer 3-4). Alternatively,

1   the Examiner found that Thiessen described limitations [1] and [2], in

2   addition to alternative limitation [4a], but did not explicitly describe

3   limitation [3], and that Lupien described limitation [3] (Answer 7). The

4   Examiner implicitly found that one of ordinary skill would have known that

5   optimization users desired equitable outcomes, and relied on this to conclude

6   that it was obvious to combine Thiessen's such equity in outcome for

7   optimization problems with Lupien's optimization.

8   The Appellant contends that Thiessen fails to describe limitations [3]

9   or [3a], and that Lupien fails to describe limitations [1] and [2]. The

10 Appellant first argues that Thiessen does not describe anything regarding

11 excesses corresponding to thresholds which are to be fairly distributed to the

12 parties according to a particular fairness criterion (Appeal Br. 21:Top ¶).

13 The Examiner responds that Thiessen describes this in the portion referring

14 to Thiessen Fig. 5 (Answer 11).

15   We disagree with the Appellant. Thiessen is directed to optimization

16 of satisfaction among multiple parties (FF 04). Thiessen uses linear

17 programming, a technique that optimizes objective values under given

18 constraints (FF 12), to optimize the satisfaction of parties by first identifying

19 a common base from the parties' initial solutions and then identifying an

20 optimal solution that maximizes the satisfaction (FF 05 & 06).

21   Thiessen attempts to maintain the satisfaction level of both parties the

22 same as in their chosen proposals while doing this (FF 07). In Thiessen's

23 Fig. 5, which is a chart of possible objective values for the satisfaction of

24 two parties, the initial proposals are identified as points B and G, and the

25 common base, the point at which both parties retain their initial proposal

26 values, is identified as point E. The X and Y values of point E are the values

to be improved upon, and therefore represent threshold values. The points in the shaded region of Fig. 5, which are those points having X and Y values greater than those for point E, are therefore excesses corresponding to the threshold values at point E. Thiessen identifies point W as the optimal solution, which distributes the excess satisfaction in equal amounts relative to point E (FF 07 - 09). Thus, Thiessen does describe excesses corresponding to thresholds which are to be fairly distributed to the parties according to a particular fairness criterion.

Next, the Appellant argues that Lupien fails to show constraints (Appeal Br. 22:Top ¶; Reply Br. 3). However, the Appellant subsequently acknowledges that Lupien has constraints, but that such constraints are that stock prices be more or less than some value for a given quantity, which the Appellant argues is the same as Lupien's threshold, while claim 1 requires separate constraints and threshold values (Appeal Br. 22:Top ¶). The Examiner responds that claim 1 does not require that the threshold values and constraints be independent of one another (Answer 13). We agree with the Examiner and find that there is no such requirement in claim 1. We also find that Lupien optimizes parties' satisfaction under the constraints the parties enter as to how many shares they are willing to trade at each price (FF 02). Thus, even if Lupien's threshold values are stock prices, claim 1 does not preclude the constraints being upon those stock prices. Further, because Lupien is directed to optimizing satisfaction, and therefore the satisfaction value each party has for a given trade is a threshold value for optimization.

Next, the Appellant argues that Lupien fails to describe the global solution comprising a first objective value for the at least one first objective

and a second objective value for the at least one second objective (Appeal
Br. 23:Top ¶). The Examiner responds these are shown in Lupien Figs. 9A-
C (Answer 13-14). These figures portray contour plots of four mutual
satisfaction solutions, each contour representing those points having the
same satisfaction value (FF 03). Each chart is a set of objective values for a
given party combination. Thus Lupien shows three sets of objective values
for objectives measured for combinations of parties. Lupien's global
solution optimizes each of the values in these charts.

Finally, the Appellant argues there is no motivation to combine
Lupien with Thiessen (Appeal Br. 23-24). We find that both references are
directed to optimizing the satisfaction among multiple parties using linear
programming techniques. Lupien is relied on principally to show the
components, such as constraints, objectives, and threshold values, that are
required in linear programming. As such, Lupien serves to document the
components that also must be in Thiessen, although Lupien also shows such
components. Accordingly, we find the motivation of applying Lupien to be
that of simply documenting what must be necessarily in Thiessen in some
form.

Claims 11-12, 27-28, and 43-44

Claim 11 further requires filtering the solutions from claim 1. The
Examiner found that the choice of satisfaction tradeoffs in Thiessen's Fig. 2
portrayed a filtering, albeit of inputs, and further found that Thiessen
actually applied the filter after the initial results were computed, and that it
would have been a matter of design choice as to whether to apply a filter at
the very end results (Answer 6 and 15-16). The Appellant contends that it is
more than design choice, because the Specification discloses that by

1 applying the filter at the end results, unacceptable solutions may be

2 discarded (Appeal Br. 27:First full ¶). The Examiner responds that

3 Thiessen's filtering of the common base candidates, as a filter on a partial

4 solution, demonstrates obviousness of applying such a filter to any solution

5 stage (Answer 15-16). We agree with the Examiner that the solution activity

6 performed by Thiessen subsequent to computing the common base to

7 produce optimal solutions effectively filters the range of possible outcomes

8 from the output subsequent to Thiessen's common base stage of processing

9 (FF 10), and that from this one of ordinary skill would have been motivated

10 to apply filtering to any output stage for the purpose of selecting a subset of

11 interest.

12 The Appellant also contends that the remaining claims are each

13 separately patentable, but provides no argument to support this contention

14 (Appeal Br. 26:Top 2 ¶'s).

15 *Claims 13-14, 29-30, 45-46, and 48-50*

16 Claim 13 further requires having the parties make a selection to

17 determine the solutions from claim 1. The Examiner found that the choice

18 of satisfaction tradeoffs in Thiessen's Fig. 2 portrayed a selection to

19 determine solutions (Answer 6 and 15-16). The Appellant provides no

20 contention against this finding. We agree with the Examiner that Thiessen's

21 Fig. 2 portrayed a selection to determine solutions (FF 10).

22 Claim 14 further requires the selection approach be either an auction

23 or a random approach. The Examiner took official notice of the notoriety of

24 auction selection methods and concluded it would have been obvious to

25 employ such a method to efficiently assign an approach (Answer 9-10). The

26 Appellant argues that there is no teaching, suggestion, or motivation for such

1   an approach in the references (Appeal Br. 28:Bottom ¶ - 29:Top ¶). The

2   Examiner responds that the Appellant has not traversed the official notice

3   (Answer 16-17). We agree with the Examiner that auction selection is

4   notoriously well known and that the Appellant has not traversed this finding.

5   Further, while the teaching, suggestion, and motivation test is one way to

6   show obviousness, it is not the only way.

7   The obviousness analysis cannot be confined by a formalistic
8   conception of the words teaching, suggestion, and motivation,
9   or by overemphasis on the importance of published articles and
10   the explicit content of issued patents. The diversity of inventive
11   pursuits and of modern technology counsels against limiting the
12   analysis in this way. In many fields it may be that there is little
13   discussion of obvious techniques or combinations, and it often
14   may be the case that market demand, rather than scientific
15   literature, will drive design trends."
16

17   *KSR,* 127 S. Ct. at 1741. In light of the notoriety of auction selection

18   methods, one of ordinary skill would have at least found this method to be a

19   predictable selection method with Lupien and Thiessen.

20

21   CONCLUSIONS OF LAW

22   The Appellant has not sustained its burden of showing that the

23   Examiner erred in rejecting claims 1-3, 5-7, 10-15, 17-19, 21-23, 26-31, 33-

24   35, 37-39, and 42-50 under 35 U.S.C. § 103(a) as unpatentable over Lupien

25   and Thiessen.

26

DECISION

To summarize, our decision is as follows:

- The rejection of claims 1-3, 5-7, 10-15, 17-19, 21-23, 26-31, 33-35, 37-39, and 42-50 under 35 U.S.C. § 103(a) as unpatentable over Lupien and Thiessen is sustained.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv) (2007).

AFFIRMED

hh

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